

This account is written by someone to whom the dynamical problem is a reality and no theoretical abstraction: he employs throughout the gravitation measure of force, and to an engineer there is no ambiguity in his use of the words pound and ton sometimes in the sense of mass or weight and sometimes in the sense of force.

Prof. A. B. W. Kennedy, in his "Mechanics of Machinery," pp. vii. and 222, has called attention to the same ambiguity of language, and points out that the word pound is used in two senses (three senses when pound-sterling is to be distinguished), which he proposes to distinguish as weight-pound and force-pound; not, observe, mass-pound and weight-pound as the mathematician would have us call them.

An article in the current number of *Wiedemann's Annalen*, No. 6, 1887, by A. Oberbeck, "Ueber die Bezeichnung der absoluten Maass-systeme," shows that a similar controversy on dynamical terminology is now going on in Germany.

The mathematical definition that "the weight of a body is the force with which the earth attracts the body" must disappear and be replaced by "the attraction of the earth on a pound, a ton, or a kilogramme, is called the force of a pound, a ton, or a kilogramme;" these are gravitational units of force, derived originally from statical considerations, but used in practice for dynamical problems also; but inasmuch as the magnitude of these units depends on the local value of g , they are unsuitable for astronomical or electrical purposes, and are now replaced in such cases by the absolute units of force, the poundals, dynes, &c.

The defect of modern dynamical teaching is the unreality of its applications; it is too much the "dynamics of a particle." Were the student accustomed to examples taken from the magnificent problems presented by the latest industrial developments, he would become accustomed to the use of gravitational and absolute units of force, and recognize their respective advantages.

A. G. GREENHILL.

Woolwich, May 30.

Upper Cloud Movements in the Equatorial Regions of the Atlantic.

RECENT communications to your paper have given the motion of the upper clouds from the eastward in the equatorial regions of the Atlantic. My observations (the result of having passed through these regions sixteen times in sailing-ships) give the motion of the upper clouds from the westward; and the motion of the intermediate cloud layers, consisting of the high low-level stratiform clouds (cirro-cumulus and such like), from a point somewhat to the north of east on the north side of the equator. Intermediate clouds are rare in the equatorial regions south of the Line. The high low-level clouds are constantly being confounded with the true high clouds.

There is another source of error in noting upper cloud movements; little attention has been paid to a movement of propagation. So marked is this at times, that they are propagated over the sky quicker than they are moving, this movement being frequently at right angles to the direction of motion.

DAVID WILSON-BARKER.

The Shadow of Adam's Peak.

THE shadow of Adam's Peak, to which Mr. Abbay refers in his letter to *NATURE*, vol. xxxvi. p. 152, is certainly not the kind of shadow that I witnessed, but that which is only seen in the clearest weather and without the intervention of mist. This is mentioned in one of the last paragraphs of my paper.

Nevertheless, I cannot think that mirage has anything to do with that shadow. When the Observatory was first established on Pike's Peak, the observers used to see the shadow of the mountain rising against the sky on the far distant horizon. At first they thought this very curious, but soon found that the appearance was always there in very fine weather.

Further observation showed conclusively that the appearance was simply the ordinary earth shadow of sunrise projected so clearly against the sky, that an irregularity such as a sharp peak could be distinguished on the edge of the generally circular shadow.

I do not think that mirage has anything to do with this anti-crepuscular shadow, but no doubt there are abundant thermometric observations in America for anyone who wishes to investigate the subject further.

RALPH ABERCROMBY.

21 Chapel Street, London, June 17

Temperature and Pressure.

I HAVE to thank Mr. S. A. Hill for replying to my letter, and it is most interesting to know that the same connexion between temperature and pressure exists in India as in Jamaica (*NATURE*, vol. xxxv. pp. 437, 606).

No doubt, as Mr. Hill observes, different localities will have different values of the coefficients λ and μ in the equation—

$$\delta T = \lambda \delta P + \mu (\delta P)^2;$$

indeed, we must expect very different values; but still, by putting $\delta P = 0$ in the equation for *minimum* temperatures, each locality should give the same limiting temperature, which we may regard as the temperature of space.

It is of course to such concordance that we must look for the determination of the temperature of space, so defined, rather than to extreme care in the taking of observations in any one particular part of the world.

With reference to Mr. Hill's remarks about extrapolation, it is hardly necessary for me to point out that astronomical refraction is caused by the whole terrestrial atmosphere, and that some law between temperature and pressure must be adopted before refraction-tables can be constructed; Mr. W. H. M. Christie, the Astronomer-Royal, has, in the *Memoirs R.A.S.*, vol. xlv. p. 177, recently pointed out how errors may arise from this source.

Indeed, errors must arise from this source. In Jamaica the values of λ and μ are not the same for mean and minimum temperatures, or, roughly speaking, for day and night; neither is it to be expected that they will be the same anywhere else. But enough has been said to indicate the importance of the problem, and the steps which should be taken for its solution.

Jamaica, June 6.

MAXWELL HALL.

British Association Sectional Procedure.

IN reference to Prof. Thompson's letter (June 16, p. 151), will you allow me to say that in 1884 I went from the meeting of the Association of American Microscopists at Rochester, N.Y., to that of the British Association at Montreal. At the former the proceedings commenced daily at 9 a.m., closing about noon, and another short session was held in the afternoon. The middle of the day was thus left at liberty for Committee work, sight-seeing, or rest, and the greater amount of work got through in the day as compared with the usual plan at our Association was very striking.

ALFRED W. BENNETT.

6 Park Village East, Regent's Park, June 18.

Mirage.

THIS afternoon, shortly after 4.30 p.m., my attention was drawn to an extraordinary and wonderfully perfect "mirage." My house, situated almost on the extreme point of Hartlepool, near the Heugh Lighthouse, overlooks with a south aspect the Hartlepool or Tees Bay, Redcar, Saltburn, and in clear weather a beautiful high coast-line stretching from Saltburn to Staithes. When first seen, all the houses of Redcar, some seven miles distant, and lying almost at sea-level, were enormously elongated to at least six or seven times their ordinary height, and looked like high square towers with intensified colouring. I could not however determine (with the aid of an opera glass) whether the phenomenon was a simple elongation or whether the upper part of the "mirage" was an inverted image of the houses. I am inclined to think that the lower two-thirds was an elongation of the buildings, while the upper third was an inverted image.

During the height of the mirage a dark misty stratum of air, bounded by a distinct upper margin parallel with the horizon, and decreasing in density towards it, stretched from the western end of Redcar through an arc of almost 90° seawards. I estimated the height of this stratum at 35' to 36' of arc. After some 10 minutes the "mirage" gradually dwindled over Redcar, but remained distinctly visible for a short time longer over Saltburn, the coast-line, and out to sea. At Saltburn, about 11½ miles distant, some of the buildings were duplicated, a white house being visible as two spots widely separated. The normal coast-line south of Saltburn was obscured by the haze, but a beautifully clear "mirage" of it was visible, taking as its horizon the upper margin of the misty air stratum, the horizon being thus bodily raised through some 36' of arc. Out at sea in an almost easterly direction a smoking steamer was faintly visible with an inverted

image, masthead touching masthead, and a small schooner under sail, some 8 or 10 miles away, exhibited an inverted image of its topsails. In the direction of Saltburn a tug-boat (paddle steamer) steaming within perhaps 2 miles of the coast was quite normal in appearance. The smoke rising from it drifting eastward appeared normal for a short time, but suddenly expanded on rising to about ten times its thickness, and then tailed off again at its topmost eastward corner to the normal thickness. A large steamship lying about half-way across the bay showed no signs of being affected by the "mirage."

These phenomena disappeared in about 20 minutes, and were followed by a haze which obscured the distance.

The weather had been very hot and sultry all day, with about 70° in the shade, and a gentle south-east by east breeze, and a perfectly clear sky.

Estimating the height of the Redcar houses at 50 feet and the distance at 7 miles, they would occupy 5' of arc; and taking the thickness of the air stratum producing the "mirage" at 35' of arc, the elongation of the buildings would be seven times their ordinary height.

Though I have been informed that "mirages" were visible on the previous hot days, the phenomenon is on the whole of rare occurrence here, and has never been witnessed by myself before.

CHAS. O. TRECHMANN.

Hartlepool, June 18.

P.S.—My point of view would be about 20 feet above sea-level.

A Suggestion for Anthropologists.

So far as the undersigned has seen, all reviewers of the "Précis d'Anthropologie," lately issued by Profs. Hovelacque and Hervé, of Paris, have noted with no little interest the attitude of the work towards the problem of the origin of man. Rejecting on the one hand the doctrine of the monogenesis of the human family in the way of a purely natural evolution out of lower forms of life, and on the other hand discrediting the polygenesis of men by special creation in different centres of distribution, these eminent anthropologists present, as the probable truth, a compromise hypothesis, which they call *transformisme polygénique*. According to this view, men were evolved from the lower animals, but in more than one original centre, and from more than one original pair. A French reviewer has well intimated the significance of this new teaching by observing that it marks a distinct schism in the ranks of the Darwinistic anthropologists, and inaugurates debates and investigations from which most important new light may be expected.

In this connexion it has occurred to me that if I were an anthropologist, and especially one of Darwinian principles, I should be exceedingly eager to institute investigations looking to the establishment or overthrow of a still different conception of the matter—one not yet studied with anything like the thoroughness which it deserves. I might call the hypothesis to which I allude the hypothesis of *transformisme bigénique*. Being neither its inventor nor a believer in it, I can the more freely call the attention of believers in transformism to its decided richness of promise. Indeed, if there is any middle ground of truth between the anthropology of Darwin and the anthropology of Agassiz, it can nowhere so hopefully be sought as precisely here. The hypothesis to which I refer is that according to which the human family consists of the descendants of two primitive human races—the one white and originating at the North Pole, the other dark and originating at the South Pole.

The only work in which I have ever found this view suggested is one published in Sweden about the year 1842, and two years later in an English translation, in London, under the following title: "The Theogony of the Hindus; with their Systems of Philosophy and Cosmogony. An Essay, by Count M. Björn-stjerna." I may be allowed to add that all I have published respecting the north polar origin of the race was already in its third edition before I had seen, or had any knowledge of, this work.

For the further satisfaction of those readers to whom the work may not be easily accessible, it may be stated that the idea is by no means elaborated and formally presented as a scientific solution of the problem of the origin of man. On the contrary, it is so transient and incidental a suggestion on the part of the Count that the substance of all he says is found in two sentences on page 177 of the English translation, as follows:—"As,

according to the nature of the thing [*i.e.* owing to the secular cooling of the earth], both the polar regions must have been prepared equally early for the reception of mankind, it is possible that the appearance of man took place at the same time in both regions; perhaps the white race in the countries about the North Pole, and the black race in those about the South Pole. A number of difficult problems might hence be solved." How singular it would be if this passing remark of a Swedish Count, writing upon the mythology of the Hindus, and more than a generation ago, should prove to be the watchword of the most advanced school of scientific anthropologists at the opening of the twentieth century.

WILLIAM F. WARREN.

Bad Gastein, Austria, June 20.

Snow in Central Germany.

IN a note in NATURE of May 12, p. 42, it was stated that the quantity of snow which fell in Central Germany from December 19 to 23, between 50° and 52° 5' N. latitude, and between 7° and 18° E. longitude, weighed no less than 10,000,000 tons. I think there is a mistake in the calculation. Supposing that the snow was equivalent only to a stratum of water of 5 centimetres in height, its weight would be not 10,000,000, but 10,000,000,000 tons.

OTTO KNOPF.

Berlin, June 21.

Meteor.

AT about 7.45 p.m. on June 19 a brilliant meteor was seen in broad daylight from this place. At a rough estimate it followed the meridian of Antares for about 30°, and disappeared near the meridian of that star.

H. KING.

Chithurst, Petersfield.

Medicine in McGill University.

IN a criticism of my "Outlines of Lectures on Physiology" which appeared in NATURE for May 12, you say:—"Pathology, or the application of physiology to disease, is hardly touched upon in this book. It is a most unfortunate omission unless both pathology and therapeutics are taught more systematically than with us." About three years ago "Institutes of Medicine" (then including physiology proper, histology, and pathology) was divided, and now these departments are each taught separately, and each is provided with its own laboratory. A systematic course of lectures and demonstrations in pathology is given, with instruction and practice in making autopsies (after Virchow). Therapeutics is taught from the physiological point of view, and also has its own laboratory. So that it only becomes necessary to make such reference to pathology, &c., in the lectures on physiology as suffices to indicate that the subject does bear on the study of disease, and thus interest the student in it from its bearing on his life-work.

It may be interesting to English readers to learn that very recently two of Montreal's citizens have given one million dollars to erect and endow a "Royal Victoria Hospital" in commemoration of the Queen's Jubilee. This hospital is to be located close to McGill University.

I make these statements simply in justice to the Medical Faculty.

T. WESLEY MILLS.

Physiological Laboratory, McGill University,
Montreal, May 28.

The University of Tokio.

IN vol. xxxv. of NATURE, p. 401, it was stated that the recent amalgamation of the Engineering College and the University of Tokio occasioned the "total elimination of Europeans from the teaching staff, their place being taken by Japanese." Justice to the new University requires the correction of this statement, which is not only misleading, but erroneous. It is true that two well-known foreign Professors vacated their posts—one immediately after the amalgamation, and the other within six months thereafter. Their place, however (for they taught the same subject), is soon to be filled by an engineer who is expected shortly from England. But giving full allowance to this temporary vacancy, any person who will take the trouble to compare the number of foreign Professors in the two establishments before the incorporation with the number